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## ABSTRACT

The Reading Recovery Program, designed to help low-achieving first graders learn to use effective reading strategies, was fully implemented in the Durham, North Carolina, public schools in the 1994-1995 school year. An evaluation was conducted to assess the effects of the program over time through the achievement of students in the 1994-1995 (n=167), 1995-1996 (n=302), and 1996-1997 (n=314) school years. The performance of Reading Recovery students was compared with that of 50 randomly selected students who did not participate in Reading Recovery. Between 7 in 10 and 8 in 10 students completed the program each year. Data indicate that the Reading Recovery program is helping significant numbers of students to read at or above the expected grade level. Five to 7 years after being exposed to Reading Recovery, students were performing within 10 to 15 percentile points of a comparison group of average students. The fact that a higher percentage of students in the comparison group were reading at or above grade level is not surprising, since the goal of Reading Recovery is to help the lowest achieving students learn to use effective reading strategies. Data also indicate that each successive cohort of Durham Public Schools Reading Recovery programs performed better than its predecessor. An appendix shows the scale scores associated with each achievement level on the North Carolina end-of-grade tests. (Contains 13 tables.) (SLD)

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## **A Longitudinal Evaluation of the Long-Term Effects of a Reading Recovery Program**

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**Paper Presented at the Annual Meetings  
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**New Orleans, Louisiana**

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## **A Longitudinal Evaluation of the Long-Term Effects of a Reading Recovery Program**

### **Executive Summary**

The Reading Recovery program was designed to help low achieving first grade children learn to use effective reading strategies. This program was partially implemented in Durham Public Schools in the 1992-93 year, and fully implemented by the 1994-95 year. This evaluation was conducted of Reading Recovery students in the 1994-95, 1995-96 and 1996-97 school years to assess the effects of the program over time.

The evaluation focuses on measures of academic performance across the three school-year cohorts and compares the performance of Reading Recovery students with that of a group of 50 randomly students who did not participate in the program and represent average students in the school system. Exceptional Children Program status (but not whether students were in programs for academically gifted and talented programs) was taken into account. Due to the longitudinal nature of the design and the type of data used for the evaluation, there was considerable variation in rates of attrition: students in the intervention and comparison (average) groups who left the school system ranged from 12.8 to 23.7 percent; and students in these groups who had incomplete data in the State's test and management information systems ranged from 11.2 to 27.2 percent.

1994-1995 Cohort. During the first full implementation year, 167 students participated in the Reading Recovery program. Four years later, 38.5 percent of these students were enrolled at or above expected grade level and 41.9 percent were one or more grade levels behind (the rest were no longer in the school system or could not be located). Of the students in the comparison (average) group, 67.4 percent were performing at or above expected grade level, and 18.6 percent were one or more grade levels behind expected grade level. Almost 7 out of every 10 students were able to successfully complete the Reading Recovery program.

1995-1996 Cohort. During the second full implementation year, 302 students participated in the Reading Recovery program. Three years later, 53.3 percent of these students were enrolled at or above expected grade level and 31.7 percent were one or more grade levels behind. Of the students in the comparison (average) group, 67.9 percent were enrolled at or above expected grade level, and 15.1 percent were one or more grade levels behind. An average of more than 8 of every 10 students was able to successfully complete the Reading Recovery program.

1996-1997 Cohort. During the third full implementation year, 314 students participated in the Reading Recovery program. Two years later, 65.1 percent of these students were enrolled at or above expected grade level and 22.1 percent were one or more grades below expected grade level. Unfortunately, no comparison (average) group was available for this cohort. Again, 8 of every 10 students was able to successfully complete the Reading Recovery program.

Discussion and Conclusion. The data used for this evaluation indicates that the Reading Recovery program is helping significant numbers of students in reading at or above expected grade levels. Five to seven years after having been exposed to the program, Reading Recovery students were performing within 10-15 percentile points of a comparison group of average students in the Durham Public Schools. The fact that a higher percentage of students in the comparison group was reading at or above grade level is not surprising, since the goal of the Reading Recovery program is to help the *lowest*

*achieving* children learn to use effective reading strategies. The data also indicate that each successive cohort of the Durham Public Schools' Reading Recovery programs performed better than its predecessor. This indicates that the program was improving over time, probably due to more effective teacher training and to teachers becoming more experienced in working with disadvantaged students.

## **A Longitudinal Evaluation of the Long-Term Effects of a Reading Recovery Program**

### **Overview of the Reading Recovery Program**

Reading Recovery is an early intervention program designed to help the lowest achieving first grade children learn to use effective reading strategies. By accelerating the progress of high-risk children, Reading Recovery provides success for young children before they enter the cycle of failure that many students experience even in their first year of school. Program proponents state...“We now know enough to guarantee that virtually every child will learn to be a good reader and writer during the first two years of school...Children's success in school depends on quality education from the start” (Lyons, Pinnell, and DeFord, 1993).

Developed by Dr. Marie Clay, a New Zealand educator and psychologist, Reading Recovery was first implemented in the United States at The Ohio State University in 1984-85. Currently, in 49 states from Oregon to South Carolina, there are trained Reading Recovery teachers implementing the program in more than 10,000 schools and 4,000 school systems. According to Wilson and Daviss (1994), “Reading Recovery has proved to be more effective and efficient at correcting reading problems than its competitors. In poor urban and posh suburban schools alike, the program consistently rehabilitates more than four of every five failing first-grade readers in just twelve to twenty weeks of daily half-hour lessons.”

According to some research, through effective implementation of Reading Recovery, 80 percent of the lowest achieving first grade children can develop effective strategies for reading and perform at or above average levels of literacy in their classrooms (Hiebert and Taylor, 1994). These children become independent readers with internal self-extending systems of communication. By reducing retention rates, the need for remedial services, and special education placements, Reading Recovery can be an educationally sound and cost-effective early intervention program, and is widely implemented throughout the world (Dyer, 1992).

Each child that enters Reading Recovery receives one-on-one daily tutoring for 12 to 20 weeks. A typical session includes: reading known stories, reading a story that was read one time during the previous session, writing a story, working with a cut-up sentence, and reading a new story. The teacher systematically records what the child does during each tutoring session and these observations form the basis for the next lesson.

In order to become certified in Reading Recovery a teacher must complete a year-long intensive graduate course in the theories, practices, and procedures of effective reading instruction. As a result, Reading Recovery teachers view reading as a “message getting, problem solving activity that increases in power and flexibility the more it is practiced” (Clay, 1991). The teachers also analyze children's reading and writing behaviors and build on their strengths as part of on-going instruction (Opitz, 1991). Teachers in Reading Recovery training participate in weekly sessions during which they observe and coach each other tutoring children one-on-one “behind the glass” of specially designed observation

classrooms. Beyond the initial year of training, Reading Recovery educators at all levels continue to refine their expertise by attending regular continuing contact sessions.

#### Supporting Research for Reading Recovery

Beginning in 1985 and continuing through the first three academic years of implementation, Reading Recovery graduates, whether attending inner city or wealthier suburban schools in Columbus, Ohio, scored three achievement levels above their classmates participating in other remedial programs. Similarly, researchers at The Ohio State University gathered statewide data on Reading Recovery students who successfully "discontinued" (a term that means "to successfully complete") the program showing that 60 percent were reading at or above their grade averages in 4th grade, 70 percent were spelling with at least average ability, and more than 80 percent were in the average or better reading groups in their classrooms (Wilson and Daviss, 1994).

Also promising are the longitudinal program evaluation data from three school systems (Columbus, Upper Arlington, and Lancaster, Ohio) implementing Reading Recovery for at least five years. Cost-benefit analyses comparing Reading Recovery with alternative interventions for high-risk first grade students indicate that these school districts will save money considerably by: 1) reducing the number of first grade retentions; 2) avoiding special education testing and diagnostic practices (which often lead to misclassification and placement of children in I.D. programs); and 3) reducing the number of students assigned to long-term remedial reading or alternative education programs (Lyons and Beaver, 1995).

A case study of Upper Arlington's implementation of Reading Recovery indicates that the program is most successful when it involves the training and support of classroom teachers, especially those teaching kindergarten, first and second grade classes. "No special program can be as effective as it might be until classroom instruction is exemplary" (Allington and Cunningham, 1996). By combining the efforts of Reading Recovery teachers, specialists, and classroom teachers, Upper Arlington Schools dramatically reduced the number of retentions in the early grades and referrals for special education services.

While both advocates of phonics and whole language instruction are quick to claim Reading Recovery as another example of their achievements, Marie Clay insists that "this isn't part of whole language." Most experts in the field of reading instruction agree that "Reading Recovery's success is due to its shrewd combination of teaching strategies from different pedagogical camps, including the use of phonics" (Levine, 1994).

#### Implementation of Reading Recovery in Durham Public Schools

A long-term commitment to the improvement of reading within the Durham (NC) Public Schools led to the development of a Literacy Study Group. In 1994, this group articulated its goals:

"All children come to school ready to continue their progress in literacy development. The schools' role is to provide ongoing, informal assessment that informs and promotes literacy instruction and builds on students' strengths and interests. Our goal is that the learners in Durham Public Schools will become confident, lifelong readers through literacy development."

With the leadership of Dr. Christopher Baker from Salem College in Winston-Salem, North Carolina, six central office administrators, six teachers, and three principals forged a system-wide literacy plan based on the above-stated beliefs and goal. The Literacy Study Group also defined reading to be:

- a complex, active process
- meaning-seeking and meaning-creating
- problem-solving and risk-taking
- the use of a variety of cueing systems and strategies that develop with practice
- dependent on attitudes and interests that need to be recognized and respected

Reading Recovery in Durham Public Schools has used a combination of Title I and local funding to provide trained Reading Recovery teachers to tutor first graders in elementary schools. Dr. Deborah Pitman, Director of Elementary Education, serves as the Reading Recovery Site Coordinator. She also has made arrangements with North Carolina Central University to offer six hours of graduate credit for teachers in Reading Recovery training through Durham Public Schools; moreover, the DPS Teacher Leaders serve as adjunct professors at NCCU.

Durham Public Schools initiated Reading Recovery in the 1992-93 school year by training two DPS teachers--Mary Clayton and Debbie Scheffe--in Wilmington, North Carolina. That same year, these teachers tutored twelve first graders as they piloted Reading Recovery. During the next school year, 1993-94, Durham Public Schools committed to training two Teacher Leaders (Mary Clayton and Cassandra Yongue) at UNC-Wilmington. Having two Teacher Leaders facilitates reaching full program implementation as quickly as possible by providing effective literacy instruction for the lowest 20 to 30 percent of the first grade population.

In 1993-94, four other teachers received Reading Recovery training in Halifax, Virginia. This enabled thirty first grade students to receive Reading Recovery instruction. In 1994-95 the two Teacher Leaders and five trained Reading Recovery teachers, as well as the 18 teachers in training, were able to serve a total of 163 first grade children.

During the 1995-96 school year more than 300 first graders received Reading Recovery instruction from 34 teachers who were trained in Durham Public Schools. In 1998, Durham Public Schools made a commitment to full implementation of the Reading Recovery program by providing one locally-funded Reading Recovery teacher for each 50 first grade students in each elementary school through the DPS Literacy Initiative. Consequently, the number of students served rose sharply in 1998-99 due to a large increase in the number of trained teachers and teachers-in-training. Presently, more than 600 first grade students are served by the Reading Recovery program each year in Durham Public Schools.

### **Observation Survey of Early Literacy Achievement**

The **Observation Survey of Early Literacy Achievement** (Clay, 1993) is the major assessment instrument used in the Reading Recovery Program. (For convenience, we will usually refer to this as the *Observation Survey* in our discussion.) Teachers in Reading Recovery can use the *Observation Survey* to assess each child's strengths in: Letter Identification, Concepts About Print, Word Test, Writing Vocabulary, Dictation Task, and Text Reading Level.

As indicated by the research cited previously, to be most effective Reading Recovery must be supported by children's classroom instruction. All first grade teachers in Durham Public Schools have

**TABLE 1**  
**Overview of Reading Recovery in Durham Public Schools**

| <u>School Year</u> | <u>Stage of Implementation</u> | <u>Number/Types of Personnel</u>                                    | <u>No. Students Served</u> | <u>Discontinued</u> |             |
|--------------------|--------------------------------|---------------------------------------------------------------------|----------------------------|---------------------|-------------|
|                    |                                |                                                                     |                            | <u>No.</u>          | <u>Pct.</u> |
| 1992 - 93          | Experimentation                | 2 Teachers in Training                                              | 12 (now 9th graders)       |                     |             |
| 1993 - 94          | Teacher Leader Training        | 2 Teacher Leaders<br>1 Trained Teacher<br>4 Teachers in Training    | 30 (now 8th graders)       |                     |             |
| 1994 - 95          | First Year of Implementation   | 2 Teacher Leaders<br>5 Trained Teachers<br>18 Teachers in Training  | 167 (now 7th graders)      | 44                  | 26.3        |
| 1995-96            | Second Year of Implementation  | 2 Teacher Leaders<br>23 Trained Teachers<br>11 Teachers in Training | 302 (now 6th graders)      | 121                 | 40.0        |
| 1996 - 97          | Third Year of Implementation   | 1 Teacher Leaders<br>28 Trained Teachers<br>11 Teachers in Training | 314 (now 5th graders)      | 164                 | 52.2        |
| 1997 - 98          | Fourth Year of Implementation  | 2 Teacher Leaders<br>38 Trained Teachers<br>8 Teachers in Training  | 389 (now 4th graders)      | 179                 | 46.0        |
| 1998 - 99          | Fifth Year of Implementation   | 3 Teacher Leaders<br>37 Trained Teachers<br>37 Teachers in Training | 628 (now 3rd graders)      | 268                 | 42.7        |
| 1999 - 2000        | Sixth Year of Implementation   | 3 Teacher Leaders<br>63 Trained Teachers<br>16 Teachers in Training | 663 (now 2nd graders)      | 267                 | 40.3        |

received training on the use of Clay's *Observation Survey* to assess children's strengths and needs in their literacy development. During the 1995-96 school year these assessments were shared with parents during conferences and compiled systemwide by the Office of Elementary Instructional Outcomes.

Children's individual profiles were given to their second grade teachers in 1996-97 to provide information about each child's growth in reading and writing. Plans are now under way to provide second grade and kindergarten teachers with similar training in using the *Observation Survey* so that all DPS elementary schools can document and assess young children's continuous progress in literacy development through the early childhood grades (K-2). Such consistent, systemic staff development is necessary to attain the goal of assuring that all students in Durham Public Schools become confident, lifelong readers.

### **K-2 Assessment Program**

The K-2 Assessment Program in Durham Public Schools was initiated in 1994-95, the first full year of implementation of the Reading Recovery Program. Although subsequently modified as to when particular tasks are to be administered, this program calls for administration of selected tasks of the *Observation Survey* at selected times (no more than once each quarter), depending upon grade level and previous student performance on a particular task. The fall administration of this K-2 Assessment Program provides data for a common starting point for the evaluation of both Reading Recovery and non-Reading Recovery students.

### **Focus of Evaluation**

This evaluation focuses on the first three years of full implementation of the Reading Recovery Program in Durham Public Schools. As shown previously in Table I, the students who received Reading Recovery services in these years (1994-95, 1995-96, and 1996-97) and have stayed on grade level (i.e., have not repeated a grade level) should now be seventh, sixth, and fifth grade students, respectively. The success of these three cohorts of Reading Recovery students is compared with the success of a random sample group<sup>1</sup> of 50 students each year, who also are tracked over the ensuing years. Unfortunately, the list of random sample group students was not available for the 1996-97 cohort, so only Reading Recovery students for that year have been tracked in this report. The results for these Reading Recovery cohort and random sample groups of students are presented in the following sections of this report.

### **1994-95 Cohort**

In 1994-95, the first year of full implementation of the Reading Recovery Program in Durham Public Schools, 167 first grade students received Reading Recovery services. In addition, there were 48 students in the random sample group. For both the Reading Recovery and random sample students for the 1994-95 school year their progress across grade levels in school is presented in Table II.

<sup>1</sup> This random sample group was selected as part of a data reporting requirement to the Ohio State University as part of the obligation of being an official Reading Recovery site. Unlike the Reading Recovery students, who are the neediest students educationally, these random sample group students represent the average student in Durham Public Schools and purposely exclude any Reading Recovery students.

As expected, a larger percentage of the Reading Recovery students (more than double that of the random sample group students) have failed one or more grades within six years after participating in the Reading Recovery Program. However, over one-third of the former Reading Recovery students in this cohort who are still in Durham Public Schools are presently on grade level. Since the Reading Recovery program serves the lowest performing first grade students, this is somewhat remarkable. Over 67 percent of the random sample group students, which excludes any Reading Recovery students, have remained with their grade level peers.

**TABLE II**  
**Progress of Students in 1994-95 Sample**  
**(Number and Percent in Each Category)**

| Current Status             | Reading Recovery Students  |                         | Random Sample Group Students |                 |
|----------------------------|----------------------------|-------------------------|------------------------------|-----------------|
|                            | All Students               | Non EC Students         | All Students                 | Non EC Students |
| On-Grade Level             | 57 (38.5%) <sup>2</sup>    | 31 (40.8)%              | 29 (67.4%)                   | 22 (62.9%)      |
| 1 Year+ Behind             | 62 (41.9%) <sup>3</sup>    | 27 (35.5%) <sup>4</sup> | 8 (18.6%) <sup>5</sup>       | 7 (20.0%)       |
| No Longer in DPS           | 29 (19.6%)                 | 18 (23.7%)              | 6 (14.0%)                    | 6 (17.1%)       |
| Cannot Locate <sup>6</sup> | 24 (11.2% of all students) |                         |                              |                 |

Table II also compares the results for all students within each group (Reading Recovery or random sample group) as to whether these students were identified under an Exceptional Childrens' classification (other than Academically/Intellectually Gifted) at any time during this period of analysis. As expected, the non-Exceptional Children performed somewhat lower as they are expected to meet more stringent requirements for grade promotion than are students in the Exceptional Childrens program to be eligible for promotion.

Using and the North Carolina State Testing Program, one can compare the success of the Reading Recovery students as compared to the Random Sample Group students. As shown in Table III on the next page, the Reading Recovery students, as expected, begin first grade considerably behind their peers in all three tasks of the Observation Survey. As these students continue through elementary school and into middle school, they continue to lag behind. On average, they are about one achievement level behind (a low achievement level 2 versus a low achievement level 3) their average

<sup>2</sup> This figure includes one Exceptional Education student who began grade 3 in 1998-99, but ended the year as a fourth grade student and began the next year as a fifth grade student as well as another Exceptional Education student who skipped a grade and was in the eighth grade when his peers were still in the seventh grade.

<sup>3</sup> This figure includes seven students who are 2 grade levels behind their grade level cohorts.

<sup>4</sup> This figure includes three students who are 2 grade levels behind their grade level cohorts.

<sup>5</sup> This figure includes one student who is 2 grade levels behind his grade level cohort.

<sup>6</sup> These students are students who could not be located in the Durham Public Schools' North Carolina State Testing Program database at any time following their participation in the Reading Recovery Program.

<sup>7</sup> This figure cannot be analyzed separately since for any student who could not be located there would be no information available to determine that student's Exceptional Children's status.

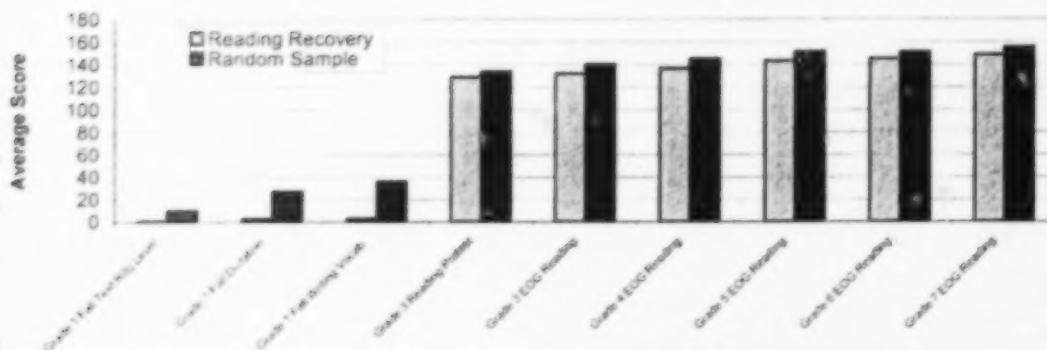
grade peers in performance. This is displayed graphically in Figure 1 below.<sup>6</sup> A similar gap exists between the Reading Recovery and random sample groups when considering only non-Exceptional Childrens' program students.

**TABLE III**  
**Achievement of All Students in the 1994-95 Sample**  
**(Number of Students and Average Scores)**

| Assessment Measure              | Reading Recovery |        |                      |        | Random Sample Group |        |                      |        |
|---------------------------------|------------------|--------|----------------------|--------|---------------------|--------|----------------------|--------|
|                                 |                  |        | Non EC Students Only |        |                     |        | Non EC Students Only |        |
|                                 | All Students     |        | All Students         |        | All Students        |        | All Students         |        |
|                                 | N                | Mean   | N                    | Mean   | N                   | Mean   | N                    | Mean   |
| Grade 1 Text Reading Level      | 127              | 0.42   | 66                   | 0.56   | 48                  | 10.17  | 36                   | 12.47  |
| Grade 1 Fall Dictation          | 127              | 2.65   | 66                   | 3.67   | 48                  | 27.23  | 36                   | 30.47  |
| Grade 1 Fall Writing Vocabulary | 128              | 2.95   | 66                   | 3.95   | 48                  | 35.87  | 36                   | 40.92  |
| Grade 3 Reading Pretest         | 105              | 128.76 | 62                   | 128.87 | 38                  | 133.87 | 29                   | 135.83 |
| Grade 3 EOG Reading             | 102              | 131.92 | 60                   | 134.57 | 39                  | 139.97 | 30                   | 143.20 |
| Grade 4 EOG Reading             | 114              | 136.41 | 63                   | 139.35 | 40                  | 144.92 | 31                   | 147.32 |
| Grade 5 EOG Reading             | 106              | 143.05 | 58                   | 145.52 | 39                  | 151.21 | 30                   | 153.40 |
| Grade 6 EOG Reading             | 105              | 145.15 | 56                   | 148.27 | 37                  | 150.81 | 27                   | 152.93 |
| Grade 7 EOG Reading             | 100              | 148.60 | 53                   | 151.87 | 34                  | 155.12 | 24                   | 158.71 |

**Figure 1**

**Achievement of 1994-95 Reading Recovery and Random Sample Students (All Students)**



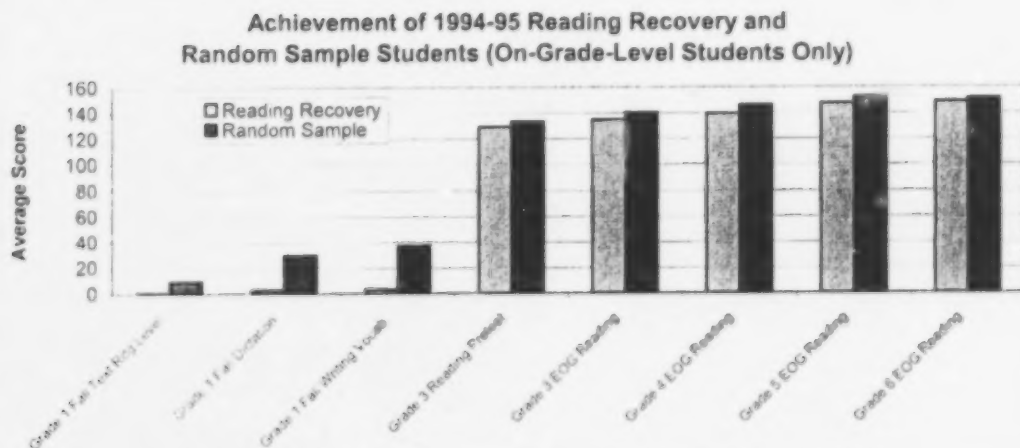
<sup>6</sup> This and the following figures are for illustration only. The highest score possible for dictation, text reading level, and writing vocabulary are 37, 44, and 61, respectively while the scale scores for reading on the North Carolina State Testing Program can range from 119 to 201. Thus, the metrics between raw scores for tasks of the Observation Survey and scale scores for the North Carolina End of Grade tests are not directly comparable.

The analysis above includes all students for whom testing data were available, whether they were on grade level or not. Another way to examine these data is to compare only those students who remained on grade level. These results are presented in Table IV. Although the numbers of students are smaller in each group, the differences between average scores are similar but the gaps are smaller. The differences in achievement level between the two groups generally are from the middle of Achievement Level 2 (for Reading Recovery students) to the bottom of Achievement Level 3 (for random sample students). A graphic display of these data is presented in Figure 2.

**TABLE IV**  
**Achievement of On-Grade Students Only in 1994-95 Sample**  
**(Number of Students and Average Scores)**

| Assessment Measure              | Reading Recovery |        |                      |        | Random Sample Group |        |                      |        |
|---------------------------------|------------------|--------|----------------------|--------|---------------------|--------|----------------------|--------|
|                                 | All Students     |        | Non EC Students Only |        | All Students        |        | Non EC Students Only |        |
|                                 |                  |        |                      |        |                     |        |                      |        |
|                                 | N                | Mean   | N                    | Mean   | N                   | Mean   | N                    | Mean   |
| Grade 1 Text Reading Level      | 35               | 0.49   | 20                   | 0.65   | 28                  | 9.57   | 21                   | 11.00  |
| Grade 1 Fall Dictation          | 35               | 3.06   | 20                   | 4.35   | 28                  | 29.43  | 21                   | 30.24  |
| Grade 1 Fall Writing Vocabulary | 36               | 3.17   | 20                   | 4.15   | 28                  | 37.43  | 21                   | 39.29  |
| Grade 3 Reading Pretest         | 47               | 129.13 | 28                   | 129.21 | 27                  | 133.00 | 20                   | 134.85 |
| Grade 3 EOG Reading             | 46               | 134.59 | 28                   | 138.04 | 28                  | 139.96 | 21                   | 143.86 |
| Grade 4 EOG Reading             | 47               | 139.28 | 29                   | 141.97 | 27                  | 146.00 | 21                   | 148.81 |
| Grade 5 EOG Reading             | 45               | 147.24 | 29                   | 148.45 | 28                  | 152.00 | 21                   | 154.81 |
| Grade 6 EOG Reading             | 46               | 148.33 | 29                   | 150.14 | 27                  | 150.85 | 20                   | 153.35 |
| Grade 7 EOG Reading             | 47               | 152.06 | 27                   | 155.37 | 25                  | 156.32 | 18                   | 160.22 |

**Figure 2**



Still another way to examine these data is to compare the performance of Reading Recovery students by their success in the program. Students are given up to 20 weeks to successfully complete the program (called "Discontinuation"), or they are referred for other services. Thus, at any point in time, Reading Recovery students can be classified into one of five categories:

- Discontinued: These students successfully exit the Reading Recovery program before or upon 20 weeks of participation in the program. These students are considered to be program successes, changing nonreaders (or not-yet readers) into readers.
- Recommended Action: These students receive 20 or more weeks of program services without achieving the criterion for successful program completion. These students are returned to the classroom as nonreaders. Some of these students may have learning disorders or other handicapping conditions.
- Incomplete Program: By the end of the school year, these are students who have not yet received 20 weeks of Reading Recovery instruction and have not met the criterion for successful program completion. These students, in almost all instances, began the program later in the school year and time ran out on them before they received a complete 20-week instruction program.
- Moved: These are students who relocate or for some reason withdraw from the program before receiving the complete 20-week instruction program.
- Other: This miscellaneous category catches all other students who do not fit one of the above categories (e.g., custody of the courts; extended illness).

Table V on the following page presents the results for each of these groups of Reading Recovery students in the 1994-95 Cohort. The students who were successfully discontinued from the program greatly outperformed the other Reading Recovery students. By the end of grade 5 and thereafter, these students had average scores of about 4 scale score points higher than for the average Reading Recovery student and more than 7 scale score points higher than Reading Recovery students who were not able to successfully complete the program within 20 weeks. In fact, by the end of the seventh grade, these Discontinued (i.e., successfully completed) Reading Recovery students had an average score within 2 scale score points of the control group students. Since the control group excluded Reading Recovery students and the Reading Recovery students were the lowest students at the time of program delivery, these successful Reading Recovery students were performing almost at a level of the average student in Durham Public Schools. The fact that the lowest students were first served by Reading Recovery is illustrated by the higher entry scores for the students who entered later in the school year (i.e., the Incomplete at End of Year students).

Finally, previous research has indicated that about four out of five can be successfully Discontinued after 20 or fewer weeks of program efforts (Hiebert and Taylor, 1994; Wilson and Daviss, 1994). For this 1994-95 cohort of students, 32 of the 41 non-EC students (78 percent) and 11 of the 21 EC students (52.4 percent) were successfully Discontinued. This is an overall success rate of 69.4 percent—somewhat less than the 80 percent found previously.

### 1995-96 Cohort

In 1995-96, the second year of full implementation of the Reading Recovery Program in Durham Public Schools, 302 first grade students received Reading Recovery services. There were 82 students in the random sample group. For both the Reading Recovery and random sample group students for this year, their progress across grade levels in school is presented in Table VI.

**TABLE V**  
**Performance of 1994-95 Sample Students by Reading Recovery Program Status**

| End of Program Status              |      | Program Entry Text Reading Level | Program Entry Dictation | Program Entry Writing Vocabulary | Grade 3 Pretest Reading Scale Score | Grade 3 Posttest Reading Scale Score | Grade 4 Posttest Reading Scale Score | Grade 5 Posttest Reading Scale Score | Grade 6 Posttest Reading Scale Score | Grade 7 Posttest Reading Scale Score |
|------------------------------------|------|----------------------------------|-------------------------|----------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Discontinued                       | Mean | 1.69                             | 9.07                    | 9.93                             | 129.30                              | 135.79                               | 140.29                               | 147.00                               | 149.32                               | 153.10                               |
|                                    | N    | 42                               | 42                      | 42                               | 37                                  | 34                                   | 38                                   | 36                                   | 38                                   | 31                                   |
|                                    | SD   | 2.18                             | 10.27                   | 11.50                            | 3.72                                | 7.86                                 | 7.78                                 | 6.62                                 | 7.38                                 | 7.85                                 |
| Recommended Action After 20+ Weeks | Mean | 0.26                             | 1.47                    | 2.11                             | 128.56                              | 129.33                               | 133.86                               | 139.31                               | 142.08                               | 145.88                               |
|                                    | N    | 19                               | 19                      | 19                               | 9                                   | 9                                    | 14                                   | 13                                   | 12                                   | 8                                    |
|                                    | SD   | 0.56                             | 1.84                    | 1.56                             | 2.56                                | 6.00                                 | 6.63                                 | 6.70                                 | 6.08                                 | 5.28                                 |
| Incomplete at End of Year          | Mean | 1.84                             | 12.67                   | 12.70                            | 128.75                              | 130.50                               | 135.21                               | 143.12                               | 144.24                               | 147.93                               |
|                                    | N    | 69                               | 69                      | 69                               | 48                                  | 48                                   | 48                                   | 41                                   | 38                                   | 44                                   |
|                                    | SD   | 1.42                             | 10.15                   | 9.57                             | 4.51                                | 7.27                                 | 7.13                                 | 7.57                                 | 8.07                                 | 8.21                                 |
| Other Reason                       | Mean | 0.34                             | 2.53                    | 2.84                             | 127.20                              | 127.10                               | 132.57                               | 137.00                               | 140.06                               | 143.41                               |
|                                    | N    | 32                               | 32                      | 32                               | 10                                  | 10                                   | 14                                   | 16                                   | 17                                   | 17                                   |
|                                    | SD   | 0.74                             | 5.19                    | 4.75                             | 4.10                                | 4.25                                 | 6.08                                 | 7.28                                 | 8.90                                 | 7.25                                 |

**TABLE VI**  
**Progress of Students in 1995-96 Sample**  
**(Number and Percent in Each Category)**

| Current Status              | Reading Recovery Students                   |                          | Random Sample Group Students |                 |
|-----------------------------|---------------------------------------------|--------------------------|------------------------------|-----------------|
|                             | All Students                                | Non EC Students          | All Students                 | Non EC Students |
| On-Grade Level              | 121 (53.3%) <sup>9</sup>                    | 90 (56.6)%               | 36 (67.9%)                   | 30 (69.8%)      |
| 1 Year+ Behind              | 72 (31.7%) <sup>10</sup>                    | 46 (28.9%) <sup>11</sup> | 8 (15.1%) <sup>12</sup>      | 5 (11.6%)       |
| No Longer in DPS            | 34 (15.0)%                                  | 23 (14.5%)               | 9 (17.0%)                    | 8 (18.6%)       |
| Cannot Locate <sup>13</sup> | 104 (27.2% of total students) <sup>14</sup> |                          |                              |                 |

As expected, a larger percentage of the Reading Recovery students have failed one or more grades within five years after participating in the Reading Recovery Program. However, more than half of the former Reading Recovery students in this cohort who are still in Durham Public Schools are presently on grade level. To have over 53 percent of the lowest performing beginning of first grade students remain on grade level five year later is somewhat remarkable. About two-thirds of the random sample group students have been able to stay on grade level.

Table VII uses available data from the Observation Survey and the North Carolina State Testing Program to compare the success of the Reading Recovery students with Random Sample Group students for all students in each sample group, analyzed separately for all students and for all students except those classified a EC (Exceptional Childrens' Program) students.

Once again, the Reading Recovery students in 1995-96 began the first grade considerably behind their peers in all three tasks of the Observation Survey. Since the Reading Recovery program was designed to serve the neediest students this result was not unexpected. As they continue through elementary school, this cohort of Reading Recovery students lags behind the performance of the random sample group of students by from 5 to 7 scale score points when the Exceptional Childrens program students are included for each cohort. This is about two-thirds of an achievement less below the growth of the average student in Durham Public Schools. Reading Recovery students are generally at the mid- to upper-level of Achievement Level 2 while the random sample group students and generally at the lower- to mid-level of Achievement Level 3. These results are presented graphically in Figure 3.

The gap between the achievement performance of these two groups for only those students who were able to stay on grade level is even slightly wider. Random sample group students do continue to outperform their Reading Recovery counterparts.

<sup>9</sup> This figure includes one Exceptional Education student who began grade 3 in 1998-99, but ended the year as a fourth grade student and began the next year as a fifth grade student.

<sup>10</sup> This figure includes four students who are 2 grade levels behind their grade level cohorts.

<sup>11</sup> This figure includes two students who are 2 grade levels behind their grade level cohorts.

<sup>12</sup> This figure includes one student who is 2 grade levels behind his grade level cohort.

<sup>13</sup> These students are students who could not be located in the Durham Public Schools' North Carolina State Testing Program database at any time following their participation in the Reading Recovery Program. Many of these students may have been from other school districts that were part of a data collection consortium.

<sup>14</sup> This figure cannot be analyzed separately since for any student who could not be located there would be no information available to determine that student's Exceptional Children's status.

**TABLE VII**  
**Achievement of Students in 1995-96 Sample**  
**(Number of Students and Average Scores)**

| Assessment Measure              | Reading Recovery |        |                      |        | Random Sample Group |        |                      |        |
|---------------------------------|------------------|--------|----------------------|--------|---------------------|--------|----------------------|--------|
|                                 | All Students     |        | Non EC Students Only |        | All Students        |        | Non EC Students Only |        |
|                                 |                  |        |                      |        |                     |        |                      |        |
|                                 | N                | Mean   | N                    | Mean   | N                   | Mean   | N                    | Mean   |
| Grade 1 Text Reading Level      | 227              | 0.76   | 174                  | 0.87   | 82                  | 16.23  | 72                   | 17.94  |
| Grade 1 Fall Dictation          | 227              | 4.55   | 174                  | 4.87   | 82                  | 32.07  | 72                   | 33.56  |
| Grade 1 Fall Writing Vocabulary | 227              | 4.67   | 174                  | 5.20   | 75                  | 44.23  | 65                   | 47.65  |
| Grade 3 Reading Pretest         | 178              | 131.75 | 129                  | 132.39 | 43                  | 136.07 | 36                   | 137.44 |
| Grade 3 EOG Reading             | 181              | 137.65 | 130                  | 139.60 | 45                  | 142.44 | 37                   | 147.49 |
| Grade 4 EOG Reading             | 194              | 140.89 | 141                  | 142.37 | 48                  | 147.10 | 39                   | 149.82 |
| Grade 5 EOG Reading             | 187              | 146.89 | 135                  | 148.44 | 46                  | 153.28 | 37                   | 156.05 |
| Grade 6 EOG Reading             | 163              | 148.83 | 116                  | 150.66 | 40                  | 156.00 | 33                   | 158.58 |

**Figure 3**

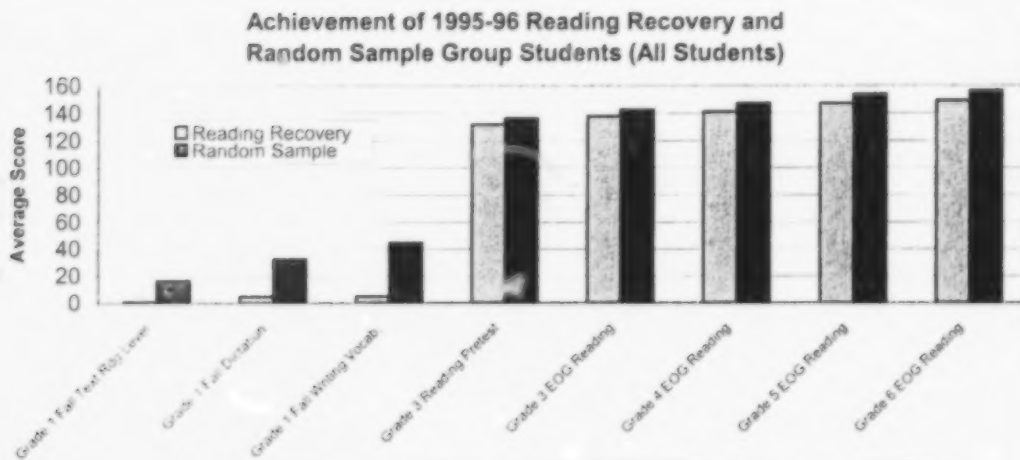


Table VIII presents the results for only students who remained at grade level in each group (Reading Recovery and random sample group). For these students, the gap is narrower. It ranges from 2 to 4.5 points at all grade levels except for the sixth grade.

However, as a word of caution, only "successful" students (that is, students staying on grade level) are considered in this analysis. This performance over time is displayed graphically in Figure 3 on the next page.

**TABLE VIII**  
**Achievement of On-Grade Students Only in 1995-96 Sample**  
**(Number of Students and Average Scores)**

| Assessment Measure              | Reading Recovery |        |                      |        | Random Sample Group |        |                      |        |
|---------------------------------|------------------|--------|----------------------|--------|---------------------|--------|----------------------|--------|
|                                 |                  |        | Non EC Students Only |        |                     |        | Non EC Students Only |        |
|                                 | N                | Mean   | N                    | Mean   | N                   | Mean   | N                    | Mean   |
| Grade 1 Text Reading Level      | 79               | 1.08   | 58                   | 1.22   | 34                  | 17.56  | 28                   | 20.14  |
| Grade 1 Fall Dictation          | 79               | 5.08   | 58                   | 5.53   | 34                  | 33.18  | 28                   | 35.39  |
| Grade 1 Fall Writing Vocabulary | 79               | 5.49   | 58                   | 6.16   | 34                  | 48.15  | 28                   | 53.04  |
| Grade 3 Reading Pretest         | 98               | 133.06 | 72                   | 134.03 | 30                  | 136.57 | 25                   | 138.20 |
| Grade 3 EOG Reading             | 102              | 140.11 | 77                   | 142.40 | 34                  | 142.29 | 28                   | 148.11 |
| Grade 4 EOG Reading             | 102              | 143.45 | 77                   | 145.38 | 34                  | 148.32 | 28                   | 150.89 |
| Grade 5 EOG Reading             | 103              | 151.09 | 78                   | 152.23 | 34                  | 154.82 | 28                   | 156.86 |
| Grade 6 EOG Reading             | 93               | 150.80 | 71                   | 152.13 | 31                  | 157.35 | 27                   | 158.59 |

**Figure 4**

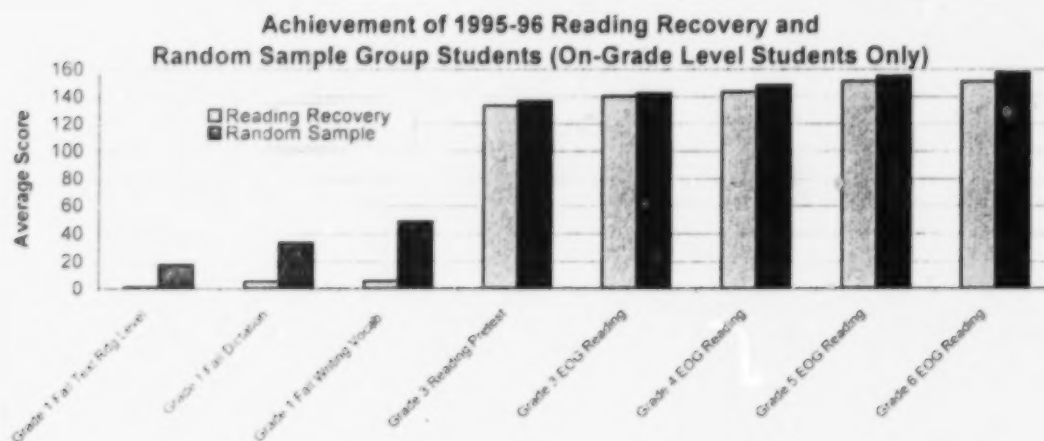


Table IX on the next page presents the results for each of these groups of Reading Recovery students in the 1995-96 Cohort. The students who were successfully discontinued from the program greatly outperformed the other Reading Recovery students. By the end of grade 3 and thereafter, these students had average scores of about 4 scale score points higher than for the average Reading Recovery student and from 8 to 12 scale score points higher than Reading Recovery students who were not able to successfully complete the program within 20 weeks.

The success rate for the 1995-96 cohort was 85.6 percent (131 out of 153) for the non-EC students and 70.8 percent (17 out of 24) for the EC students. This results in an overall success rate of 83.6 percent (148 out of 177 students), which is somewhat higher than that found in previous studies.

**TABLE IX**  
**Performance of 1995-96 Sample Students by Reading Recovery Program Status**

| End of Program Status              |      | Program Entry Text Reading Level | Program Entry Dictation | Program Entry Writing Vocabulary | Grade 3 Pretest Reading Scale Score | Grade 3 Posttest Reading Scale Score | Grade 4 Posttest Reading Scale Score | Grade 5 Posttest Reading Scale Score | Grade 6 Posttest Reading Scale Score |
|------------------------------------|------|----------------------------------|-------------------------|----------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Discontinued                       | Mean | 1.75                             | 13.36                   | 13.06                            | 133.33                              | 141.29                               | 144.63                               | 151.56                               | 152.54                               |
|                                    | N    | 144                              | 145                     | 145                              | 96                                  | 97                                   | 98                                   | 94                                   | 81                                   |
|                                    | SD   | 1.89                             | 11.21                   | 12.02                            | 7.43                                | 7.92                                 | 8.01                                 | 8.18                                 | 8.05                                 |
| Recommended Action After 20+ Weeks | Mean | 0.48                             | 3.00                    | 3.41                             | 129.20                              | 132.36                               | 136.50                               | 139.13                               | 141.00                               |
|                                    | N    | 27                               | 27                      | 27                               | 10                                  | 11                                   | 16                                   | 15                                   | 11                                   |
|                                    | SD   | 0.80                             | 3.14                    | 2.59                             | 2.15                                | 7.90                                 | 5.18                                 | 7.71                                 | 7.68                                 |
| Incomplete at End of Year          | Mean | 2.10                             | 17.66                   | 17.64                            | 130.44                              | 134.36                               | 138.00                               | 144.57                               | 147.56                               |
|                                    | N    | 80                               | 80                      | 80                               | 52                                  | 53                                   | 55                                   | 53                                   | 50                                   |
|                                    | SD   | 1.48                             | 9.23                    | 12.40                            | 4.34                                | 7.97                                 | 8.43                                 | 8.84                                 | 7.06                                 |
| Other Reason                       | Mean | 0.84                             | 4.81                    | 5.33                             | 128.80                              | 131.65                               | 135.36                               | 139.56                               | 141.67                               |
|                                    | N    | 43                               | 43                      | 43                               | 20                                  | 20                                   | 25                                   | 25                                   | 21                                   |
|                                    | SD   | 1.41                             | 7.26                    | 6.16                             | 3.81                                | 6.36                                 | 7.17                                 | 7.50                                 | 6.92                                 |

## 1996-97 Cohort

The school year 1996-97 was the third year of full implementation of the Reading Recovery Program in Durham Public Schools, with 317 first grade students receiving Reading Recovery services. There were no random sample group students available for this cohort of Reading Recovery students.

As expected, a large percentage of the Reading Recovery students have failed one or more grades within four years after participating in the Reading Recovery Program (Table X). However, almost two-thirds of the former Reading Recovery students in this cohort who are still in Durham Public Schools are presently on grade level. Since Reading Recovery students are the lowest performing first grade students, this is somewhat remarkable.

**TABLE X**  
**Progress of Students in 1996-97 Sample**  
**(Number and Percent in Each Category)**

| Current Status              | Reading Recovery Students                  |                          | Random Sample Group Students |                 |
|-----------------------------|--------------------------------------------|--------------------------|------------------------------|-----------------|
|                             | All Students                               | Non EC Students          | All Students                 | Non EC Students |
| On-Grade Level              | 168 (65.1)%                                | 127 (66.8)%              | ---                          | ---             |
| 1 Year+ Behind              | 57 (22.1)% <sup>15</sup>                   | 34 (17.9)% <sup>16</sup> | ---                          | ---             |
| No Longer in DPS            | 33 (12.8)%                                 | 29 (15.3)%               | ---                          | ---             |
| Cannot Locate <sup>17</sup> | 59 (18.6% of total students) <sup>18</sup> |                          |                              |                 |

Table XI uses available data from the Observation Survey and the North Carolina State Testing Program to provide the success of the Reading Recovery students over time through the end of the fifth grade, analyzed separately for all students and for all students except those classified as EC (Exceptional Children's Program) students. As shown below and compared with data for the previous cohorts (see Tables III and IV, VI & VII), the Reading Recovery students in 1996-97 began the first grade at about the same level as the previous two cohorts on all three tasks of the Observation Survey. However, by the end of the fifth grade they were 1 to 4 scale score points higher than these previous cohorts on the fifth Grade End of Grade Tests.

Table XII presents the results for only students who remained at grade level. For these students, the gap is narrower. It ranges from 2 to 4.5 points at all grade levels except for the sixth grade. Their scores are slightly higher than for all of the Reading Recovery students as a whole for this year, but are not markedly different.

<sup>15</sup> This figure includes nine students who are 2 grade levels behind their grade level cohorts.

<sup>16</sup> This figure includes five students who are 2 grade levels behind their grade level cohorts.

<sup>17</sup> This figure cannot be analyzed separately since for any student who could not be located there would be no information available to determine that student's Exceptional Children's status.

<sup>18</sup> This figure is artificially high as for any student who could not be located there would be no information available to determine that student's Exceptional Children's status.

**TABLE XI**  
**Achievement of Students in 1996-97 Sample**  
**(Number of Students and Average Scores)**

| Assessment Measure              | Reading Recovery |        |                      |        |
|---------------------------------|------------------|--------|----------------------|--------|
|                                 | All Students     |        | Non EC Students Only |        |
|                                 |                  |        | N                    | Mean   |
| Grade 1 Text Reading Level      | 245              | 0.50   | 195                  | 0.47   |
| Grade 1 Fall Dictation          | 246              | 5.51   | 196                  | 5.72   |
| Grade 1 Fall Writing Vocabulary | 247              | 4.53   | 197                  | 4.83   |
| Grade 3 Reading Pretest         | 204              | 132.66 | 155                  | 133.45 |
| Grade 3 EOG Reading             | 199              | 139.31 | 154                  | 140.23 |
| Grade 4 EOG Reading             | 228              | 142.09 | 167                  | 143.41 |
| Grade 5 EOG Reading             | 222              | 148.36 | 160                  | 149.43 |

**TABLE XII**  
**Achievement of On-Grade Students Only in 1996-97 Sample**  
**(Number of Students and Average Scores)**

| Assessment Measure              | Reading Recovery |        |                      |        |
|---------------------------------|------------------|--------|----------------------|--------|
|                                 | All Students     |        | Non EC Students Only |        |
|                                 |                  |        | N                    | Mean   |
| Grade 1 Text Reading Level      | 122              | 0.57   | 94                   | 0.52   |
| Grade 1 Fall Dictation          | 123              | 6.40   | 95                   | 6.59   |
| Grade 1 Fall Writing Vocabulary | 123              | 5.28   | 95                   | 5.53   |
| Grade 3 Reading Pretest         | 150              | 133.33 | 114                  | 134.19 |
| Grade 3 EOG Reading             | 151              | 140.68 | 116                  | 141.19 |
| Grade 4 EOG Reading             | 155              | 144.13 | 118                  | 145.05 |
| Grade 5 EOG Reading             | 157              | 150.71 | 119                  | 151.26 |

Table XIII on the following page presents the results for each of these groups of Reading Recovery students in the 1996-97 Cohort. The students who were successfully discontinued from the program outperformed the other Reading Recovery students. By the end of grade 3 and thereafter, these students had average scores of 3 or more scale score points higher than for the average Reading Recovery student and about 8 scale score points higher than Reading Recovery students who were not able to successfully complete the program within 20 weeks.

**TABLE XIII**  
**Performance of 1996-97 Sample Students by Reading Recovery Program Status**

| End of Program Status              |      | Program Entry Text Reading Level | Program Entry Dictation | Program Entry Writing Vocabulary | Grade 3 Pretest Reading Scale Score | Grade 3 Posttest Reading Scale Score | Grade 4 Posttest Reading Scale Score | Grade 5 Posttest Reading Scale Score |
|------------------------------------|------|----------------------------------|-------------------------|----------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Discontinued                       | Mean | 2.17                             | 17.09                   | 16.66                            | 134.70                              | 142.40                               | 145.18                               | 151.93                               |
|                                    | N    | 155                              | 155                     | 154                              | 124                                 | 124                                  | 124                                  | 119                                  |
|                                    | SD   | 2.21                             | 11.41                   | 13.88                            | 6.70                                | 7.86                                 | 7.55                                 | 7.11                                 |
| Recommended Action After 20+ Weeks | Mean | 0.24                             | 4.39                    | 3.61                             | 129.29                              | 133.76                               | 136.40                               | 144.00                               |
|                                    | N    | 37                               | 38                      | 38                               | 21                                  | 17                                   | 30                                   | 31                                   |
|                                    | SD   | 0.55                             | 3.84                    | 2.80                             | 4.24                                | 8.42                                 | 7.67                                 | 9.72                                 |
| Incomplete at End of Year          | Mean | 1.98                             | 17.67                   | 16.02                            | 130.52                              | 135.69                               | 139.78                               | 145.28                               |
|                                    | N    | 60                               | 60                      | 60                               | 33                                  | 32                                   | 41                                   | 40                                   |
|                                    | SD   | 1.41                             | 9.31                    | 9.51                             | 5.08                                | 7.98                                 | 6.76                                 | 8.42                                 |
| Other Reason                       | Mean | 0.49                             | 4.47                    | 4.33                             | 128.21                              | 132.08                               | 138.32                               | 142.80                               |
|                                    | N    | 49                               | 49                      | 49                               | 24                                  | 24                                   | 31                                   | 30                                   |
|                                    | SD   | 0.82                             | 5.69                    | 4.48                             | 3.19                                | 7.69                                 | 7.07                                 | 6.09                                 |

The success rate for the 1996-97 cohort was 85 percent (147 out of 173) for the non-EC students and 56.7 percent (17 out of 30) for the EC students. This results in an overall success rate of 80.8 percent (164 out of 203 students), which also about the same as found in previous studies.

### Conclusions

Reading Recovery students are the neediest of the poor performing first grade students, functioning at extremely low levels on tasks of the Observation Survey before receiving Reading Recovery services. However, from five to seven years after participating in the Reading Recovery program they are performing within about 10-15 percentile points of the average student in Durham Public Schools. This is somewhat surprising since a much higher proportion of students in Reading Recovery (from 20 percent to 48 percent) have been diagnosed as Exceptional Students than for the average student in the random sample group (from 12 percent to 29 percent).

Much lower proportions of students later identified as needing Exceptional Children's services were able to successfully Discontinue the Reading Recovery program. Overall, the success rate in the present study was about the same as that found in previous studies (Hiebert and Taylor, 1994; Wilson and Daviss, 1994). After only a 69.4 percent success rate during the initial year of implementation, it increased to 83.6 and 80.8 percent during the second and third years of program implementation.

A large proportion of Reading Recovery students remain on-grade level in their studies several years following participation in the program in the first grade. This ranges from 65 percent on grade level four years after program participation to 38.5 percent on grade level six years after program participation. Comparable rates for random sample group (average) students are 68 percent after five years and 67 percent after six years.

Finally, a large percentage of those students who were successfully Discontinued from the Reading Recovery program during the first grade were able to stay with their grade level peers in subsequent grades. For the 1994-95 cohort, 14 of the 25 non-EC students (56 percent) who were Discontinued were still on-grade level six years later in the seventh grade. For the 1995-96 cohort, 64 of the 80 non-EC students (80 percent) who were Discontinued were still on-grade level five years later in the sixth grade. For the 1996-97 cohort, 94 of the 104 non-EC students (90.4 percent) who were Discontinued were still on-grade level four years later in the fifth grade.

Thus, the Reading Recovery program, at least as implanted in Durham Public Schools, has improved in its performance since its earliest implementation, is being successful with a large proportion (over 80 percent) of the neediest students in the system, and has allowed these students to complete successfully in later grade levels.

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## **APPENDIX**

### **Range of Scale Scores Associated with each Achievement Level On the North Carolina End-of-Grade Tests**

Range of scores associated with each achievement level for score reporting

| Subject/Grade    |      | Level I | Level II | Level III | Level IV |
|------------------|------|---------|----------|-----------|----------|
| EOG Reading      | PT3  | 119-127 | 128-132  | 133-144   | 145-162  |
|                  | 3    | 114-130 | 131-140  | 141-150   | 151-172  |
|                  | 4    | 118-134 | 135-144  | 145-155   | 156-179  |
|                  | 5    | 124-138 | 139-148  | 149-158   | 159-182  |
|                  | 6    | 124-140 | 141-151  | 152-161   | 162-183  |
|                  | 7    | 126-144 | 145-154  | 155-163   | 164-183  |
|                  | 8    | 132-144 | 145-155  | 156-165   | 166-187  |
|                  | 10   | 132-150 | 151-162  | 163-174   | 175-201  |
| EOG Mathematics  | PT 3 | 105-117 | 118-125  | 126-134   | 135-154  |
|                  | 3    | 98-124  | 125-137  | 138-149   | 150-173  |
|                  | 4    | 111-131 | 132-142  | 143-155   | 156-182  |
|                  | 5    | 117-140 | 141-149  | 150-160   | 161-188  |
|                  | 6    | 130-145 | 146-154  | 155-167   | 168-196  |
|                  | 7    | 134-151 | 152-160  | 161-172   | 173-203  |
|                  | 8    | 137-154 | 155-164  | 165-177   | 178-208  |
|                  | 10   | 141-159 | 160-171  | 172-188   | 189-226  |
| HSCT Mathematics |      |         |          |           |          |

#### Achievement Levels Defined

- Achievement Level 1:** Students performing at this level do not have sufficient mastery of knowledge in this subject area to be successful at the next level.
- Achievement Level 2:** Students performing at this level demonstrate inconsistent mastery of knowledge and skills in this subject area and are minimally prepared to be successful at the next level.
- Achievement Level 3:** Students performing at this level consistently demonstrate mastery of the subject matter and skills and are well-prepared for the next level.
- Achievement Level 4:** Students performing at this level consistently perform in a superior manner clearly beyond that required to be proficient at the next level.